

# Annual European Union greenhouse gas inventory 1990–2013 and inventory report 2015

## Submission to the UNFCCC Secretariat

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**The full report and annexes are available at:**  
**<http://www.eea.europa.eu/publications/european-union-greenhouse-gas-inventory-2015>**

# Executive summary

## ES.1 Background information on greenhouse gas inventories and climate change

The European Union (EU), as a party to the United Nations Framework Convention on Climate Change (UNFCCC), reports annually on greenhouse gas (GHG) inventories for the years 1990 to t-2 for emissions and removals within the area covered by its Member States (i.e. domestic emissions taking place within its territory).

The present report is the official 2015 submission under the UNFCCC, with data for the years 1990–2013. It does not constitute an official submission under the Kyoto Protocol, even though some of the information included may relate to the requirements under the Kyoto Protocol.

The legal basis for the compilation of the EU inventory is Regulation (EU) No 525/2013 of the European Parliament and of the Council of 21 May 2013 on a mechanism for monitoring and reporting GHG emissions and for reporting other information at national and Union level relevant to climate change and repealing Decision No 280/2004/EC<sup>(1)</sup>.

This Regulation establishes a mechanism for:

- a) ensuring the timeliness, transparency, accuracy, consistency, comparability and completeness of reporting by the Union and its Member States to the UNFCCC Secretariat;
- b) reporting and verifying information relating to commitments of the Union and its Member States pursuant to the UNFCCC, to the Kyoto Protocol and to decisions adopted thereunder, and evaluating progress towards meeting those commitments;
- c) monitoring and reporting all anthropogenic emissions by sources and removals by sinks of GHGs not controlled by the Montreal Protocol on substances that deplete the ozone layer in Member States;

- d) monitoring, reporting, reviewing and verifying GHG emissions and other information pursuant to Article 6 of Decision No 406/2009/EC;
- e) reporting the use of revenue generated by auctioning allowances under Article 3d(1) or (2) or Article 10(1) of Directive 2003/87/EC, pursuant to Article 3d(4) and Article 10(3) of that Directive;
- f) monitoring and reporting on the actions taken by Member States to adapt to the inevitable consequences of climate change in a cost-effective manner;
- g) evaluating progress by the Member States towards meeting their obligations under Decision No 406/2009/EC.

The new Monitoring Mechanism Regulation has enhanced the reporting rules on GHG emissions to meet the requirements arising from international climate agreements, as well as the 2009 EU climate and energy package. Starting in 2014, GHG inventory reporting takes place under this new legal instrument, which replaces and expands the previous Monitoring Mechanism Decision 280/2004/EC.

The EU GHG inventory comprises the direct sum of emissions from the national inventories compiled by the EU Member States making up the EU-28. Energy data from Eurostat are used for the reference approach for CO<sub>2</sub> emissions from fossil fuels developed by the Intergovernmental Panel on Climate Change (IPCC).

The main institutions involved in the compilation of the EU GHG inventory are the 28 Member States, the European Commission Directorate-General for Climate Action (DG CLIMA), the European Environment Agency (EEA) and its European Topic Centre on Air Pollution and Climate Change Mitigation (ETC/ACM), Eurostat, and the Joint Research Centre (JRC).

(<sup>1</sup>) <http://eur-lex.europa.eu/legal-content/EN/TXT/?qid=1448384547941&uri=CELEX:32013R0525> OJ L 165, 18.6.2013, p. 13–40e.

The annual process of compiling the EU GHG inventory is indicated below. Please note that in 2015, due to the delay in the availability of a functioning UNFCCC reporting software ('CRF Reporter') the annual process of compiling the EU GHG inventory has been delayed by several months.

1. Member States submit their annual GHG inventories by 15 January each year (30 August in 2015) to the European Commission (DG CLIMA), with a copy to the EEA.
2. The EEA and its ETC/ACM, Eurostat, and JRC then perform initial checks on the submitted data. The draft EU GHG inventory and inventory report are circulated to Member States for review and comments by 28 February (15 October in 2015).
3. Member States check their national data and the information presented in the EU GHG inventory report, respond to specific findings from the initial QA/QC checks by the EU inventory team, send updates if necessary, and review the EU inventory report by 15 March (30 October in 2015).

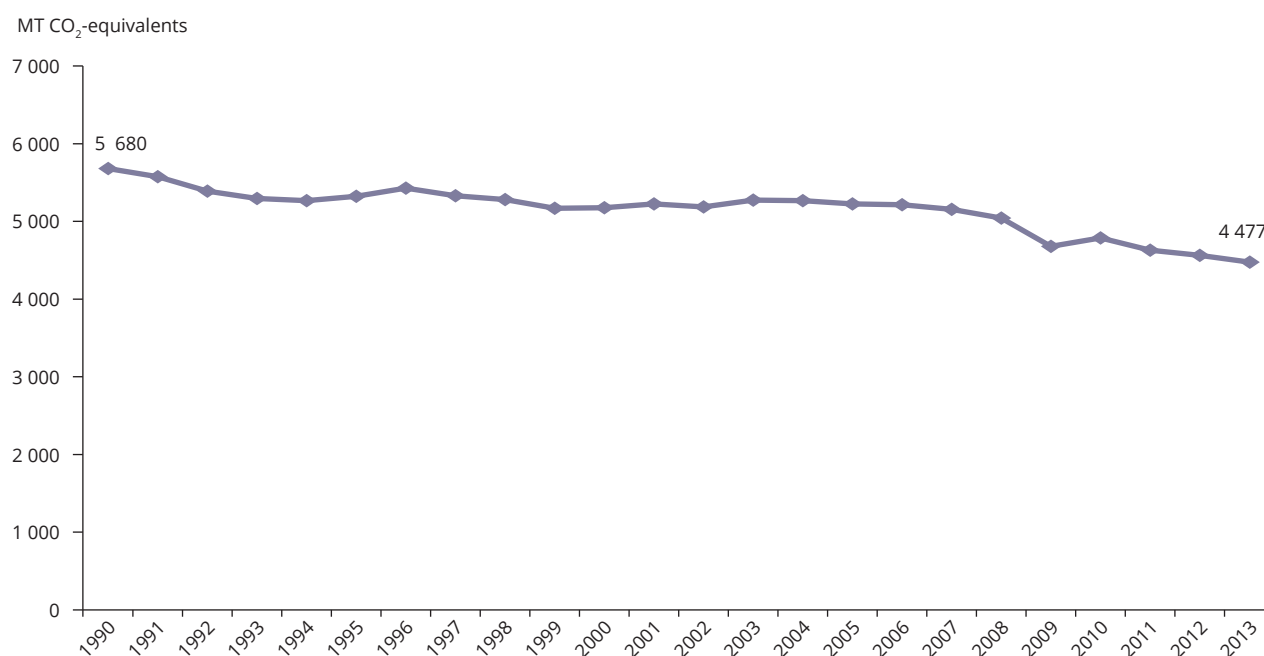
4. The EEA and its ETC/ACM review final inventory submissions from Member States and their responses to the initial checks, prepare the final EU GHG inventory and inventory report by 15 April (27 November in 2015), so that they can be submitted to the UNFCCC.
5. A resubmission is prepared by 27 May if needed (not applicable in 2015).

## ES.2 Summary of greenhouse gas emission trends in the EU

Total GHG emissions excluding Land Use Land Use Change and Forestry (LULUCF) amounted to 4 477 million tonnes CO<sub>2</sub>-equivalent in 2013 (4 481 million tonnes including indirect CO<sub>2</sub> emissions). All EU-28 totals provided in this report will be without indirect CO<sub>2</sub> emissions <sup>(2)</sup>.

In 2013, total GHG emissions were 21.2% below 1990 levels and (-1203 million tonnes CO<sub>2</sub>-equivalent). Emissions decreased by 1.9% (86 million tonnes CO<sub>2</sub>-equivalent) between 2012 and 2013 (Figure ES. 1).

**Figure ES.1 EU-28 GHG emissions 1990–2013 (excl. LULUCF)**



**Notes:** GHG emission data for the EU-28 as a whole refer to domestic emissions (i.e. within its territory) and do not include emissions and removals from LULUCF; nor do they include emissions from international aviation and international maritime transport. CO<sub>2</sub> emissions from biomass with energy recovery are reported as a Memorandum item according to UNFCCC guidelines and are not included in national totals. In addition, no adjustments for temperature variations or electricity trade are considered. The global warming potentials are those from the 2006 IPCC Guidelines for National Greenhouse Gas Inventories.

<sup>(2)</sup> According to the UNFCCC reporting guidelines, Annex I Parties may report indirect CO<sub>2</sub> from the atmospheric oxidation of CH<sub>4</sub>, CO and NMVOCs. For Parties that decide to report indirect CO<sub>2</sub> the national totals shall be presented with and without indirect CO<sub>2</sub>. For technical reasons in the 2015 inventory submission, the EU-28 totals shown in this report are based on national totals excluding LULUCF and excluding indirect CO<sub>2</sub>. This does not pre-empt the inclusion of these emissions in future inventory submissions.

**Main trends by source category, 1990-2013**

Total GHG emissions (excluding LULUCF) in the EU-28 decreased by 1 203 million tonnes since 1990 (or 21.2%) reaching their lowest level during this period in 2013.

There has been an absolute decoupling of gross domestic product (GDP) and GHG emission compared to 1990, with an increase in GDP of about 45% alongside a decrease in emissions of over 21% over the 23-year period. This was partly due to growing shares of renewables, less carbon intensive fuels in the energy mix and improvements in energy efficiency. GHG emissions decreased in the majority of sectors between 1990 and 2013, with the notable exception of transport, including international transport, and refrigeration and air conditioning. At the aggregate level, reductions were largest for industrial sectors (combustion and processes), electricity and heat production, and residential combustion. A combination of factors explains lower emissions in industrial sectors, such as improved efficiency and carbon intensity as well as structural changes in the economy. The economic recession that began in the second half of 2008 and continued through to 2009 also had an

impact on emissions from industrial sectors. Emissions from electricity and heat production decreased strongly since 1990. In addition to improved energy efficiency there has been a move towards less carbon intense fuels at EU level. Between 1990 and 2013, the use of solid and liquid fuels in thermal stations decreased strongly whereas natural gas consumption doubled, resulting in reduced CO<sub>2</sub> emissions per unit of fossil energy generated. Emissions in the residential sector also represented one of the largest reductions. Energy efficiency improvements from better insulation standards in buildings and a less carbon-intensive fuel mix can partly explain lower demand for space heating in the EU as a whole over the past 23 years.

In terms of the main GHGs, CO<sub>2</sub> accounts for the largest reduction in emissions since 1990. Reductions in emissions from N<sub>2</sub>O and CH<sub>4</sub> have been substantial, reflecting lower levels of mining activities, lower agricultural livestock, as well as lower emissions from managed waste disposal on land and from agricultural soils.

Table ES. 1 shows those sources with the largest contribution to the change in total GHG emissions in the EU-28 between 1990 and 2013.

**Table ES.1 Overview of EU-28 source categories whose emissions increased or decreased by more than 20 million tonnes CO<sub>2</sub>-equivalent in the period 1990–2013**

Source category	Million tonnes (CO <sub>2</sub> -equivalent)
Road transportation (CO <sub>2</sub> from 1.A.3.b)	119
Refrigeration and air conditioning (HFCs from 2.F.1)	91
Commercial/institutional (CO <sub>2</sub> from 1.A.4.a)	- 20
Fluorochemical production (HFCs from 2.B.9)	- 28
Direct N <sub>2</sub> O emissions from managed soils (N <sub>2</sub> O from 3.D.1)	- 31
Cement production (CO <sub>2</sub> from 2.A.1)	- 31
Oil and natural gas and other emissions from energy production (CH <sub>4</sub> from 1.B.2)	- 34
Nitric acid production (N <sub>2</sub> O from 2.B.2)	- 45
Adipic acid production (N <sub>2</sub> O from 2.B.3)	- 57
Manufacture of Solid fuels and other energy industries (CO <sub>2</sub> from 1.A.1.c)	- 61
Enteric fermentation (CH <sub>4</sub> from 3.A)	- 61
Managed waste disposal sites (CH <sub>4</sub> from 5.A.1)	- 71
Coal mining and handling (CH <sub>4</sub> from 1.B.1.a)	- 74
Residential (CO <sub>2</sub> from 1.A.4.b)	- 75
Iron and steel production (CO <sub>2</sub> from 1A2a +2C1)	- 107
Public electricity and heat production (CO <sub>2</sub> from 1.A.1.a)	- 267
Manufacturing industries (excl. iron and steel) (energy-related CO <sub>2</sub> from 1A2 excl. 1A2a)	- 290
<b>Total</b>	<b>- 1 203</b>

**Notes:** As the table only presents sectors whose emissions have increased or decreased by at least 20 million tonnes CO<sub>2</sub>-equivalent, the sum for each country grouping EU-28 do not match the total change listed at the bottom of the table.



**Main trends by source category, 2012–2013**

Table ES. 2 shows the source categories making the largest contribution to the change in GHG emissions in the EU-28 between 2012 and 2013.

**Main reasons for emission changes, 2012–2013**

Total GHG emissions (excluding LULUCF) decreased by 1.9% (86 million tonnes CO<sub>2</sub>-equivalent) between 2012 and 2013. This significant decrease in emissions in 2013 came along with a slight increase in GDP of 0.2% compared to 2012 where GDP had contracted by 0.5%. The largest reduction in GHG emissions occurred in the energy sector. Over 80% of the total GHG emissions reduction in 2013 was accounted for by lower CO<sub>2</sub> emissions from electricity production in thermal power stations. Primary energy consumption declined overall, with fossil emissions decreasing for all fuels and particularly for solid fuels. The consumption of renewable energy continued its long term trend of higher shares in the energy mix. The GHG emissions intensity of the EU energy system also improved as a result of the less carbon intensive fuel mix in 2013.

The 86 million tonnes (CO<sub>2</sub>-equivalent) decrease in GHG emissions in the EU-28 between 2012 and 2013 occurred mainly in the following categories.

- **CO<sub>2</sub> from public electricity and heat production** (– 70 million tonnes or – 6%)

Emission reductions in this category were mainly caused by an increase in renewable energy,

especially in a higher share of hydro electricity generation and reduced electricity demand.

- **CH<sub>4</sub> from managed waste disposal sites** (– 7 million tonnes or – 7%)

Emission reductions were mainly caused by a decline in the United Kingdom, Italy, Germany and France. In general, emissions from this source decline because the amount of biodegradable waste being landfilled is reduced every year. A second reason for the decline in 2013 compared to 2012 is an increase in CH<sub>4</sub> recovery from landfills.

- **CO<sub>2</sub> from petroleum refining** (– 7 million tonnes or – 6%)

Input of crude oil in refineries declined by 6%. This reflects a decline of final energy consumption of petroleum products and an increase in imports of petroleum products from outside of the EU.

- **CO<sub>2</sub> from manufacturing industries (excl. iron and steel)** (– 6 million tonnes or – 2%)

Emission reductions were driven by a decline in industrial production. Gross value added in industry declined by 0.3% between 2012 and 2013.

- **CO<sub>2</sub> from cement production** (– 3 million tonnes or – 5%)

In the EU-28 cement production declined by 5% which reflected the general economic and construction downturn of the last years.

**Table ES.2 Overview of EU-28 source categories whose emissions increased or decreased by more than 3 million tonnes CO<sub>2</sub>-equivalent in the period 2012–2013**

Source category	Million tonnes (CO <sub>2</sub> -equivalent)
Commercial/institutional (CO <sub>2</sub> from 1.A.4.a)	8
Residential (CO <sub>2</sub> from 1.A.4.b)	6
Refrigeration and air conditioning (HFCs from 2.F.1)	3
Coal mining and handling (CH <sub>4</sub> from 1.B.1.a)	– 3
Road transportation (CO <sub>2</sub> from 1.A.3.b)	– 3
Manufacture of solid fuels and other energy industries (CO <sub>2</sub> from 1.A.1.c)	– 3
Cement production (CO <sub>2</sub> from 2.A.1)	– 3
Manufacturing industries (excl. Iron and steel) (energy-related CO <sub>2</sub> from 1A2 excl. 1A2a)	– 6
Petroleum refining (CO <sub>2</sub> from 1.A.1.b)	– 7
Managed waste disposal sites (CH <sub>4</sub> from 5.A.1)	– 7
Public electricity and heat production (CO <sub>2</sub> from 1.A.1.a)	– 70
<b>Total</b>	<b>– 86</b>

**Notes:** As the table only presents sectors whose emissions have increased or decreased by at least 3 million tonnes of CO<sub>2</sub>-equivalent, the sum for each country grouping does not match the total change listed at the bottom of the table.

**Table ES.3 GHG emissions in CO<sub>2</sub>-equivalent (excl. LULUCF)**

Member State	1990 (million tonnes)	2013 (million tonnes)	2012-2013 (million tonnes)	Change 2012-2013 (%)	Change 1990-2013 (%)
Austria	78.7	79.6	-0.2	-0.2	1.2
Belgium	147.1	119.4	0.2	0.2	-18.8
Bulgaria	109.4	55.9	-5.3	-8.6	-48.9
Croatia	35.1	24.5	-1.0	-4.0	-30.3
Cyprus	5.6	8.3	-0.8	-8.9	49.7
Czech Republic	193.4	127.1	-3.5	-2.6	-34.2
Denmark	69.3	54.6	2.0	3.8	-21.2
Estonia	40.0	21.7	2.3	12.0	-45.7
Finland	71.1	63.0	0.6	1.0	-11.4
France	549.4	490.2	0.7	0.1	-10.8
Germany	1 247.9	950.7	22.6	2.4	-23.8
Greece	105.0	105.1	-7.5	-6.6	0.1
Hungary	94.2	57.4	-2.6	-4.3	-39.1
Ireland	56.7	58.8	-0.8	-1.3	3.7
Italy	521.1	437.3	-31.6	-6.7	-16.1
Latvia	26.2	10.9	-0.1	-0.5	-58.3
Lithuania	47.8	19.9	-1.3	-6.1	-58.3
Luxembourg	12.9	11.1	-0.6	-5.1	-13.5
Malta	2.0	2.8	-0.4	-12.1	39.4
Netherlands	219.5	195.8	-0.5	-0.2	-10.8
Poland	473.9	394.9	-3.9	-1.0	-16.7
Portugal	60.4	65.1	-1.9	-2.8	7.7
Romania	253.3	110.9	-10.0	-8.3	-56.2
Slovakia	75.5	43.7	0.0	-0.1	-42.2
Slovenia	18.6	18.2	-0.7	-3.9	-2.1
Spain	290.7	322.0	-26.7	-7.7	10.8
Sweden	71.8	55.8	-1.6	-2.7	-22.4
United Kingdom	803.7	572.1	-13.5	-2.3	-28.8
<b>EU-28</b>	<b>5 680.2</b>	<b>4 476.8</b>	<b>-85.9</b>	<b>-1.9</b>	<b>-21.2</b>

### ES.3 Summary of emissions and removals by main greenhouse gas

Table ES. 4 gives an overview of the main trends in EU-28 GHG emissions and removals for 1990–2013. The most important GHG by far is CO<sub>2</sub>, accounting for 82% of total EU-28 emissions in 2013 excluding LULUCF. In 2013, EU-28 CO<sub>2</sub> emissions without LULUCF

were 3 650 million tonnes, which was 18% below 1990 levels. Compared to 2012, CO<sub>2</sub> emissions decreased by 2%, representing 94% in total decrease in emissions in 2013. Emissions of CH<sub>4</sub>, SF<sub>6</sub> and NF<sub>3</sub> decreased in 2013, while N<sub>2</sub>O, HFCs and perfluorocarbons (PFCs) increased in 2013.

More detailed information can be found in Chapter 2.

**Table ES.4 Overview of EU-28 GHG emissions and removals from 1990 to 2013 in CO<sub>2</sub>-equivalent (million tonnes)**

Greenhouse gas emissions	1990	1995	2000	2005	2010	2011	2012	2013
Net CO <sub>2</sub> emissions/removals	4 185	3 903	3 836	3 952	3 607	3 459	3 402	3 320
CO <sub>2</sub> emissions (without LULUCF)	4 460	4 201	4 162	4 286	3 934	3 788	3 728	3 650
CH <sub>4</sub>	751	682	621	553	494	486	480	468
N <sub>2</sub> O	413	373	333	311	265	260	257	258
HFCs	29	44	53	71	96	99	101	104
PFCs	25	17	12	7	4	4	4	4
Unspecified mix of HFCs and PFCs	6	6	2	1	0	0	0	0
SF <sub>6</sub>	11	15	10	8	6	6	6	6
NF <sub>3</sub>	0.02	0.04	0.12	0.16	0.12	0.13	0.09	0.07
<b>Total (with net CO<sub>2</sub> emissions/removals)</b>	<b>5 421</b>	<b>5 040</b>	<b>4 866</b>	<b>4 903</b>	<b>4 472</b>	<b>4 315</b>	<b>4 250</b>	<b>4 159</b>
<b>Total (without CO<sub>2</sub> from LULUCF)</b>	<b>5 696</b>	<b>5 338</b>	<b>5 192</b>	<b>5 238</b>	<b>4 799</b>	<b>4 643</b>	<b>4 576</b>	<b>4 489</b>
<b>Total (without LULUCF)</b>	<b>5 680</b>	<b>5 322</b>	<b>5 177</b>	<b>5 224</b>	<b>4 786</b>	<b>4 630</b>	<b>4 563</b>	<b>4 477</b>

#### ES.4 Summary of emissions and removals by main source and sink category

Table ES. 5 gives an overview of EU-28 GHG emissions in the main source categories for 1990–2013. The most important sector by far is energy (i.e. combustion

and fugitive emissions), accounting for 79% of total EU-28 emissions in 2013. The second largest sector is agriculture (10%), followed by industrial processes (8%). More detailed trend descriptions are included in the individual sector chapters (Chapters 3–7).

**Table ES.5 Overview of EU-28 GHG emissions in the main source and sink categories 1990 to 2013 in CO<sub>2</sub>-equivalent (million tonnes)**

Greenhouse gas source and sink	1990	1995	2000	2005	2010	2011	2012	2013
1. Energy	4 356	4 088	4 018	4 115	3 798	3 650	3 604	3 524
2. Industrial processes and product use	511	491	443	449	376	374	360	360
3. Agriculture	569	495	481	455	442	442	439	441
4. Land-use, land-use change and forestry	- 260	- 282	- 311	- 321	- 314	- 316	- 312	- 318
5. Waste	244	248	235	205	170	164	159	152
6. Other	0.03	0.02	0.02	0.02	0.01	0.01	0.01	0.01
<b>Total (with net CO<sub>2</sub> emissions/removals)</b>	<b>5 421</b>	<b>5 040</b>	<b>4 866</b>	<b>4 903</b>	<b>4 472</b>	<b>4 315</b>	<b>4 250</b>	<b>4 159</b>
<b>Total (without LULUCF)</b>	<b>5 680</b>	<b>5 322</b>	<b>5 177</b>	<b>5 224</b>	<b>4 786</b>	<b>4 630</b>	<b>4 563</b>	<b>4 477</b>

## ES.5 Summary of EU Member State emission trends

Table ES. 6 gives an overview of Member State contributions to EU GHG emissions for 1990–2013. Member States show large variations in GHG emission trends.

The overall EU GHG emission trend is dominated by the two largest emitters, Germany (21%) and the United Kingdom (13%), accounting for more than one third of total EU-28 GHG emissions in 2013. These 2 Member States have achieved total domestic GHG emission reductions in 2013 of 529 million tonnes of CO<sub>2</sub>-equivalent compared to 1990, not counting carbon sinks and the use of Kyoto mechanisms.

The main reasons for the favourable trend in Germany were increasing efficiency in power and heating plants and the economic restructuring of the five new *Länder* after German reunification. The reduction of GHG emissions in the United Kingdom were primarily the result of liberalising energy markets and the subsequent fuel switches from oil and coal to gas in electricity production, and N<sub>2</sub>O emission reduction measures in the production of adipic acid.

France and Italy were the third and fourth largest emitters in 2013, with a share in the EU total of 11% and 10% respectively. Italy's GHG emissions were 16% below 1990 levels in 2013. Italian GHG emissions increased from 1990 onwards, primarily due to increases in road transport, electricity and

**Table ES.6 Overview of Member States' contributions to EU GHG emissions excluding LULUCF from 1990 to 2013 in CO<sub>2</sub>-equivalent (million tonnes)**

Member State	1990	1995	2000	2005	2010	2011	2012	2013
Austria	79	79	80	92	85	83	80	80
Belgium	147	154	149	145	133	123	119	119
Bulgaria	109	75	60	64	61	66	61	56
Croatia	35	25	27	31	28	28	26	24
Cyprus	6	7	8	10	10	10	9	8
Czech Republic	193	153	146	144	136	135	131	127
Denmark	69	77	70	65	62	57	53	55
Estonia	40	20	17	18	20	20	19	22
Finland	71	72	70	69	76	68	62	63
France	549	548	554	555	516	489	490	490
Germany	1 248	1 120	1 044	993	943	923	928	951
Greece	105	111	128	136	119	116	113	105
Hungary	94		74	76	65	64	60	57
Ireland	57	60	69	71	63	59	60	59
Italy	521	533	554	578	506	494	469	437
Latvia	26	13	10	11	12	11	11	11
Lithuania	48	22	20	23	21	21	21	20
Luxembourg	13	10	10	13	12	12	12	11
Malta	2	2	3	3	3	3	3	3
Netherlands	219	231	219	213	214	200	196	196
Poland	474	445	393	398	408	405	399	395
Portugal	60	71	84	88	70	69	67	65
Romania	253	184	141	147	118	123	121	111
Slovakia	76	55	50	52	47	46	44	44
Slovenia	19	19	19	20	19	19	19	18
Spain	291	331	390	441	357	355	349	322
Sweden	72	74	69	67	65	61	57	56
United Kingdom	804	755	720	698	616	570	586	572
<b>EU-28</b>	<b>5 680</b>	<b>5 322</b>	<b>5 177</b>	<b>5 224</b>	<b>4 786</b>	<b>4 630</b>	<b>4 563</b>	<b>4 477</b>

heat production, and petroleum refining. However, Italian emissions decreased from 2004 with significant drops in 2009 and 2012, which were also due to the economic crisis and reductions in industrial output during these years. France's emissions were 11% below 1990 levels in 2013. In France, large reductions were achieved in N<sub>2</sub>O emissions from adipic acid production, but CO<sub>2</sub> emissions from road transport and HFC emissions from consumption of halocarbons increased considerably between 1990 and 2013.

Poland and Spain are the fifth and sixth largest emitters in the EU-28, accounting for 9% and 7% of total EU-28 GHG emissions in 2013. Spain increased emissions by 11% between 1990 and 2013. This was largely due to emission increases from road transport, electricity and heat production, and households and services. Poland decreased GHG emissions by 17% between 1990 and 2013. The main factors for decreasing emissions in Poland — as with other new Member States — were the decline of energy-inefficient heavy industry and the overall restructuring of the economy in the late 1980s and early 1990s. The notable exception was transport (especially road transport), where emissions increased.

## ES.6 Other information

### *International aviation and maritime transportation*

Emissions of GHGs from international aviation and shipping activities increased between 1992 and 2007. Emissions decreased between 2007 and 2010 in the EU-28 — partly reflecting the economic recession — increased in 2011 and subsequently decreased again in 2012 and 2013. EU GHG emissions from international aviation are lower than the emissions from international maritime transport, but they were increasing more rapidly until 2007. The average annual EU-28 growth rates in emissions since 1990 were 3% for aviation and 1% for maritime transport. CO<sub>2</sub> emissions from international transport reached 271 million tonnes CO<sub>2</sub>-equivalent in 2013.

For detailed information on emissions from international bunkers see Section 3.7 of this report.

### *Information on recalculations*

As new global warming potentials from the 2006 IPCC guidelines have been used in 2015 for CH<sub>4</sub>, N<sub>2</sub>O and fluorinated gases the recalculations in GHG emissions are not only the result of methodological changes and revised activity data but also reflect the new global warming potentials.

Due to recalculations based on EU Member States' GHG inventories in 2015, total EU-28 1990 GHG emissions excluding LULUCF have increased in the latest submission, compared to the previous submission, by 1.0%. EU-28 GHG emissions for 2012 increased by 0.4% due to recalculations.

For detailed information on recalculations see Chapter 10 and the sector-specific recalculations.

### *Information on using EU ETS for national GHG inventories in EU Member States*

This report also includes an analysis of the use of data and emissions reported under the EU ETS for preparing national GHG inventories. The analysis shows that most Member States used the ETS data to improve and refine the estimation and reporting of CO<sub>2</sub> emissions from energy and industrial processes. 27 Member States indicated that they used ETS data for quality assurance/ quality control purposes and checked data consistency between both sources (Section 1.4.2). Croatia joined the EU in July 2013 and has participated in the EU ETS since January 2013. For the 2015 submission, Croatia did not use any ETS data, but has plans to improve its GHG emission estimates with ETS data.

16 Member States indicated that they directly use the verified emissions reported by installations under the ETS. 23 Member States used ETS data to improve country-specific emission factors and 22 Member States reported that they used activity data (e.g. fuel use) provided under the ETS in the national inventory. The use of ETS data improved the quality of GHG inventory data with respect to completeness (additional emission sources can be estimated for which no data were available before the EU ETS), accuracy (e.g. due to improved country-specific emission factors), and improved allocation of emissions to CRF source categories.



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